



UNIVERSITAT POLITÈCNICA DE CATALUNYA
BARCELONATECH

Escola Superior d'Enginyeries Industrial,
Aeroespacial i Audiovisual de Terrassa

BEKASI-EAST JAKARTA AIRPORT AIR SIDE

Attachment

Degree: Master's degree in Aerospace Engineering

Course: 220304 - Airports design and construction

Delivery date: 10-12-2017

Students: Abiétar Moreno, Sergi; Delgado Chicote, Miguel; Fernández Porta, Sergi;
Fernández Sanz, Sergio; Fontanes Molina, Pol and Vidal Pedrola, Xavier



Contents

List of Tables	v
List of Figures	vi
1 Airport location and characterization	1
1.1 Location	1
1.2 Meteorology	1
1.2.1 Temperature	1
1.2.2 Wind	1
2 Runway design	2
2.1 Runway 1	2
2.2 Runway length	4
2.2.1 Runway length for reference aircraft	4
2.2.2 Final runway length	4
2.3 Runway width	4
2.3.1 Runway width for reference aircraft	4
2.3.2 Final runway width	4
2.4 Reference code	4
2.5 Declared distances	4
2.6 Protection and safety areas	4
2.6.1 Runway shoulders	4
2.6.2 Runway strips	4
2.6.3 Runway end safety area (RESA)	4
2.6.4 Stopway (SWY)	4
2.6.5 Clearway (CWY)	4
3 Taxiway design	5
3.1 Introduction	5
3.2 Taxiway width	5
3.3 Taxiway turns	5
3.4 Taxiway overwidths (sobreanchos)	5
3.5 Taxiway shoulders	5



3.6	Taxiway strips	5
3.7	Rapid exit taxiways	5
3.7.1	Introduction	5
3.7.2	Number of rapid exit taxiways	5
3.7.3	Design of rapid exit taxiways	5
4	Holding positions	6
4.1	Introduction	6
4.2	Minimum distance between holding position and runway	6
4.3	Interference with critical and ILS sensible areas	6
4.4	Interference with CWY and physical obstacles	6
4.4.1	Separation between aircraft (guardas entre aeronaves)	6
4.5	Final design of holding positions	6
5	Apron design	7
5.1	Introduction	7
5.2	Apron taxiways	7
5.3	Aircraft stands	7
5.3.1	General dimensions of aircraft stands	7
5.3.2	Dimensions for reference aircraft	7
5.3.3	Aircraft stands organization	7
5.4	No equipment and holding equipment areas	7
5.5	Apron trajectories	7
5.6	Service ways in apron	7
5.7	Terminal connections	7
6	Markings	8
6.1	Runway markings	9
6.1.1	Runway centerline markings	9
6.1.2	Runway side strip markings	9
6.1.3	Runway threshold markings	9
6.1.4	Runway l designation marking	9
6.1.5	Runway aiming point markings	9
6.1.6	Runway touchdown zone markings	9
6.2	Taxiway markings	9
6.2.1	Taxiway centerline markings	9
6.2.2	Taxiway strip markings	9
6.2.3	Taxiway holding position markings	9
6.2.4	Intermediate holding position markings	9
6.2.5	Runway entry holding position markings	9
6.2.6	Mandatory instruction marking	9
6.3	Apron markings	9



6.3.1	Apron lead in line markings	9
6.3.2	Apron boundary markings	9
6.3.3	End of aircraft movement area markings	9
6.3.4	Stand lead in line for multiple useable parking stands	9
6.3.5	Equipment parking line markings	9
6.3.6	Stand safety line markings	9
6.3.7	Aircraft stop line markings	9
6.3.8	Aircraft stand markings	9
6.3.9	Service way markings	9
7	Lights	10
7.1	Runway lights	11
7.1.1	Approach lights	11
7.1.2	Approach slope indication systems	11
7.1.3	Runway threshold identification lights	11
7.1.4	Runway edge lights	11
7.1.5	Runway threshold and wing bar lights	11
7.1.6	Runway end lights	11
7.1.7	Touchdown zone lights	11
7.1.8	Runway rapid exit lights	11
7.2	Taxiway lights	11
7.2.1	Taxiway lights	11
7.2.2	Taxiway lights for an exit taxiway	11
7.2.3	Taxiway light for a rapid exit taxiway	11
7.2.4	Taxiway edge lights	11
7.2.5	Stop bar lights	11
7.2.6	Intermediate holding point lights	11
7.3	Apron lights	11
7.3.1	Line and edge apron lights	11
7.3.2	Projector based apron lighting	11
7.3.3	Visual guidanced system for parking	11
8	Signs	12
8.1	Mandatory instruction signs	12
8.2	Information signs	12
9	High-voltage electrical system	13
9.1	Electrical system general design	13
9.2	Connection sub-stations	13
9.3	Electric powerplant	13
9.4	Electrical transformation center	13
9.5	Channeling and distribution of the electrical system	13



10 Medium voltage electrical system	14
10.1 Beacon circuits	15
10.1.1 Runway centerline lighting system	15
10.1.2 Taxiway centerline lighting system	15
10.1.3 Runway and taxiway centerlines lighting system	15
10.1.4 Approach lighting system	15
10.1.5 Touchdown zone lighting system	15
10.1.6 Runway header lighting system	15
10.1.7 RETIL electrical circuit	15
10.1.8 PAPI electrical circuit	15
10.1.9 Stop bar electrical circuit	15
10.1.10 Signs electrical circuit	15
10.2 Regulation chambers	15
10.3 Wire channeling	15
11 Aeronautical limitation surfaces	16
11.1 Physical limitation surfaces	16
11.2 ILS limitation surfaces	16
11.3 Localizer limitation surfaces	16
11.4 Gliding trajectory protection limitation surfaces	16
12 Bibliography	17



List of Tables

2.1.1 LiPo 4S 5000mAh 20-40C SLS XTRON 3



List of Figures

2.1.1 Main plane. 3



1 | Airport location and characterization

test

1.1 Location

1.2 Meteorology

1.2.1 Temperature

1.2.2 Wind



2 | Runway design

2.1 Runway 1

B777-300ER and A330-300, are found to be the bigger planes with higher requirements to operate on the new airport. Comparing both aircrafts, the B777-300ER is the most restrictive one, with an MTOW of 350.000Kg versus the 233.000kg of MTOW of the A330-300.

The dimensions of the aircraft are the following:



Figure 2.1.1: Main plane.

Fig. 2.1.1

Features	
Voltage	14.8V
Type	LiPo 4S1P
Max. continuous discharge	20C (100A)
Charging current	4C (20A)
Weight	499g
Connectors	XT60, JST-XH(balancing)

Table 2.1.1: LiPo 4S 5000mAh 20-40C SLS XTRON



2.2 Runway length

2.2.1 Runway length for reference aircraft

2.2.2 Final runway length

2.3 Runway width

2.3.1 Runway width for reference aircraft

2.3.2 Final runway width

2.4 Reference code

2.5 Declared distances

2.6 Protection and safety areas

2.6.1 Runway shoulders

2.6.2 Runway strips

2.6.3 Runway end safety area (RESA)

2.6.4 Stopway (SWY)

2.6.5 Clearway (CWY)



3 | Taxiway design

3.1 Introduction

3.2 Taxiway width

3.3 Taxiway turns

3.4 Taxiway overwidths (sobreanchos)

3.5 Taxiway shoulders

3.6 Taxiway strips

3.7 Rapid exit taxiways

3.7.1 Introduction

3.7.2 Number of rapid exit taxiways

3.7.3 Design of rapid exit taxiways



4 | Holding positions

4.1 Introduction

4.2 Minimum distance between holding position and runway

4.3 Interference with critical and ILS sensible areas

4.4 Interference with CWY and physical obstacles

4.4.1 Separation between aircraft (guardas entre aeronaves)

4.5 Final design of holding positions



5 | Apron design

5.1 Introduction

5.2 Apron taxiways

5.3 Aircraft stands

5.3.1 General dimensions of aircraft stands

5.3.2 Dimensions for reference aircraft

5.3.3 Aircraft stands organization

5.4 No equipment and holding equipment areas

5.5 Apron trajectories

5.6 Service ways in apron

5.7 Terminal connections





6 | Markings

6.1 Runway markings

6.1.1 Runway centerline markings

6.1.2 Runway side strip markings

6.1.3 Runway threshold markings

6.1.4 Runway I designation marking

6.1.5 Runway aiming point markings

6.1.6 Runway touchdown zone markings

6.2 Taxiway markings

6.2.1 Taxiway centerline markings

6.2.2 Taxiway strip markings

6.2.3 Taxiway holding position markings

6.2.4 Intermediate holding position markings

6.2.5 Runway entry holding position markings

6.2.6 Mandatory instruction marking

AIR SIDE

6.3 Apron markings

R - 9

6.3.1 Apron lead in line markings





7 | Lights

7.1 Runway lights

7.1.1 Approach lights

7.1.2 Approach slope indication systems

7.1.3 Runway threshold identification lights

7.1.4 Runway edge lights

7.1.5 Runway threshold and wing bar lights

7.1.6 Runway end lights

7.1.7 Touchdown zone lights

7.1.8 Runway rapid exit lights

7.2 Taxiway lights

7.2.1 Taxiway lights

7.2.2 Taxiway lights for an exit taxiway

7.2.3 Taxiway light for a rapid exit taxiway

7.2.4 Taxiway edge lights

7.2.5 AIR SIDE Stop bar lights

7.2.6 Intermediate holding point lights



8 | Signs

8.1 Mandatory instruction signs

8.2 Information signs



9 | High-voltage electrical system

9.1 Electrical system general design

9.2 Connection sub-stations

9.3 Electric powerplant

9.4 Electrical transformation center

9.5 Channeling and distribution of the electrical system





10 | Medium voltage electrical system

10.1 Beacon circuits

10.1.1 Runway centerline lighting system

10.1.2 Taxiway centerline lighting system

10.1.3 Runway and taxiway centerlines lighting system

10.1.4 Approach lighting system

10.1.5 Touchdown zone lighting system

10.1.6 Runway header lighting system

10.1.7 RETIL electrical circuit

10.1.8 PAPI electrical circuit

10.1.9 Stop bar electrical circuit

10.1.10 Signs electrical circuit

10.2 Regulation chambers

10.3 Wire channeling



11 | Aeronautical limitation surfaces

11.1 Physical limitation surfaces

11.2 ILS limitation surfaces

11.3 Localizer limitation surfaces

11.4 Gliding trajectory protection limitation surfaces



12 | Bibliography